

organic compounds, and Dr. Armstrong arranges them all under the following nine heads:—Hydrocarbons, Alcohols, Ethers, Aldehydes, Ketones, Acids, Anhydrides, Amines, and Organio-Metallic Bodies. To each class he devotes a few lines of explanation; in fact, the whole chapter is a general outline of what is to follow, and is very useful as giving a general and comprehensive view of the whole subject. The kind of action exerted by the most important reagents on organic bodies is next described, and will be useful to the student who already has some knowledge of the bodies acted on. After thus disposing of these introductory matters, the systematic study of the different classes of bodies above named is commenced and carried through, chapter by chapter, nearly in the above order, the study of Carbon itself forming the starting-point.

The book will certainly prove of great use in this country and do good service in extending a knowledge of organic chemistry. Students in general will hardly look upon it as an interesting text-book; long lists of rare substances, whose only real interest at present is in their constitution, cannot be made very attractive. The descriptions, however, of important methods of preparation and of purification of different bodies are very well given, and there is a reality and freshness about them which is not generally met with in systematic works on organic chemistry. Dr. Armstrong has evidently not been content to obtain all his information second hand.

The book will probably become the standard text-book on organic chemistry in this country, and in future editions probably will develop into a larger work; at present even it contains much detail, and is suited rather for the advanced student than for the mere beginner.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Mr. Herbert Spencer and Physical Axioms

IN my letter, published in NATURE, vol. x. p. 104, I asked the following question—Does Mr. Spencer regard the second law of motion as an “unconsciously-formed preconception,” or as a “corollary of a preconception,” or as a “consciously-formed hypothesis”?

This led to a correspondence with Mr. Spencer, which he has thought well to publish, with comments, as part of a pamphlet containing appendices to his former pamphlet entitled “Mr. Herbert Spencer and the British Quarterly Reviewer.” Consequently, I should be glad if you would allow me space for a few final words to state what now appears to be the result of the controversy.

By the fuller explanation with which Mr. Spencer has favoured me, it has now been made clear that, on his theory of the evolution of physical axioms, the second law of motion is not itself a “preconception,” but a “corollary of a preconception,” that is, a truth implied in, but only evolved by conscious mental processes from, the preconception; though he afterwards somewhat qualifies this statement by admitting conscious observation to have its share in the result, when he says, “Observation aids in disentangling the truth that this relation between force and motion is more distinct where the actions are simplest—so leading to the intuition that the proportionality is absolute where the simplicity is absolute.” I state this, in fairness to Mr. Spencer, because he lays stress on the distinction, and rightly so from the point of view of psychological theory; though as regards my argument that the second law of motion is not to be regarded as in any sense an *a priori* cognition, it is a side issue of no importance.

But with respect to the main issue, I have at length obtained a definite reply in a passage which I proceed to quote from Mr. Spencer's comments on my last letter to him. I had said—“Various hypotheses as to the relation between force and change of motion may be made, all consistent with the general preconception of the proportionality of cause and effect, and between which the mind alone is unable to decide, until it calls to its aid conscious observation or experiment.” To which Mr. Spencer rejoins—(the italics are mine)—“This is perfectly true. I have said nothing to the contrary. My argument implies nothing to the contrary. *I am not concerned with the question how impressed force is to be measured, or how alteration of motion is to be measured.* The second law of motion is a purely abstract statement, and I hold it to be *a priori* only in its abstract form. It asserts that the alteration of motion (a right mode of measurement being assumed) is proportional to the impressed force (a right mode of measurement being assumed). I do not affirm that we know, *a priori*, in what terms of space and time and mass change of motion is to be expressed. The law, as formulated, leaves this unspecified; and all I hold to be *a priori* is that which is alone stated in the law.”

To the mathematician and physicist, comment on this is hardly necessary. I was right when I said, in a former note, that there is little left to argue about. The osteologist may doubtless for his own purposes speak of the skeleton of a horse as a horse, though the dry bones would be a sorry substitute for the living animal to a man who wanted it to do his work. And so, too, Mr. Spencer, as a psychologist, might (if it did not lead to that disastrous confusion which we have complained that his use or misuse of the terms of physical science does lead to) speak of the second law of motion “in its abstract form” as the second law of motion; but assuredly Newton, who had carefully defined quantity of motion and of motive force before enunciating his “*Axiomata sive Leges Motus*,” did not regard it as a “purely abstract statement;” and every mathematician and physicist, who has to any extent followed in Newton's steps, knows that all that gives life and force—that is, power to generate new results and to co-ordinate and explain the external phenomena with which physics is concerned—to this or any other physical axiom is not its *a priori* basis or abstract form, but that element in it which has been derived from conscious observation or experiment.

The upshot of the whole controversy, then, is that the physical axioms of Mr. Spencer are not the living truths which form the basis of the physical sciences, but the bare abstract forms in which those truths may conveniently—possibly Mr. Spencer would say *must*—be expressed. I trust that the value of this result, to the readers of Mr. Spencer's first principles, may be some atonement for the space and time which the controversy has occupied.

HARROW

ROBERT B. HAYWARD

Darwin on “The Origination of Life”

WE are constantly meeting with an objection to Mr. Darwin's writings, urged alike by friends and foes, on the score of his not having published his views concerning the origin of life. As this objection refers to a matter of literary taste rather than to anything of substantial importance, in ordinary cases it is best met by silence; but when a President of the British Association gives it a prominent position in his inaugural address, it is time that a dissentient view should be raised.

Towards the close of his discourse, Dr. Tyndall observes:—“The origination of life is a point lightly touched upon, if at all, by Mr. Darwin and Mr. Spencer. Diminishing gradually the number of progenitors, Mr. Darwin comes at length to one ‘primordial form;’ but he does not say, as far as I remember, how he supposes this form to have been introduced. He quotes with satisfaction the words of a celebrated author and divine who had ‘gradually learnt to see that it is just as noble a conception of the Deity to believe He created a few original forms capable of self-development into other and needful forms, as to believe that He required a fresh act of creation to supply the voids caused by the action of His laws.’ What Mr. Darwin thinks of this view of the introduction of life I do not know. Whether he does or does not introduce his ‘primordial form’ by a creative act, I do not know. But the question will inevitably be asked, ‘How came the form there?’ . . . We need clearness and thoroughness here,” &c. Now, I submit that although this is a question which must “inevitably be asked,” it is nevertheless a question with which Mr. Darwin has nothing whatever to do. The problem concerning the origin of life is as distinct from

that concerning the origin of species, as any two problems can well be; and it does not devolve upon a writer to speculate upon the one, merely because he has solved the other. Those who have taken the greatest interest in Mr. Darwin's illustrious career cannot have failed to appreciate the admirable forbearance he has always displayed in not allowing himself to digress into collateral topics, however great the temptation to digress may be. All his vast and numerous conquests of thought have been achieved by a rigid adherence to the philosophy of fact; there is a grand consistency in the maintaining of a method, according to which pure speculation is nowhere permitted to assert itself, excepting in so far as it is absolutely necessary. Surely it would be a deplorable thing were "the epoch-making book" allowed to present a gratuitous deviation from this method, merely in order to plunge into a sea of *à priori* conceptions where inductive verification is as yet impossible. The passage quoted by Prof. Tyndall is adduced by Mr. Darwin only in order to show that so far as the doctrine of the transmutation of species is concerned, the evolution theory supplies us with "just as noble a conception of the Deity" as does the theory of special creation. Regarding the more ultimate question, everyone must say with Dr. Tyndall, "What Mr. Darwin thinks of the introduction of life I do not know;" and this, I take it, is just the condition in which the author of the "Origin of Species" should allow his opinions to take their place in history. In short, those who censure Mr. Darwin for his praiseworthy reticence regarding "the far higher problem of the essence or origin of life, upon which science as yet throws no light,"* would do well to consider the beautiful example of scientific caution that is afforded by the manner in which this very subject is treated of in the concluding pages of the last edition of the "Origin;" and I am sure that I am only expressing the opinion of the majority of Mr. Darwin's admirers when I say, that whatever our ontological views may happen to be, we all unite in sincerely hoping that, in subsequent editions, he will not spoil the splendour of his finished work by indulging in speculations as foreign to his subject as they must be unprofitable in themselves.

Aug. 21

A DISCIPLE OF DARWIN

Meteors

ON referring to my record of meteors for the 8th inst., I find two meteors nearly at the times mentioned by Prof. Tait (vol. x. p. 305), viz., 10.33 and 10.53. That at 10.33 was, from its position as seen here, unquestionably *not* identical with the one he saw. That at 10.53 may possibly be the same, if by Monoceros Prof. Tait means the constellation commonly marked at Equuleus. If such is the case, a calculation, rough as the data necessitates, would give for the meteor's height at the beginning 144 miles; at the end, 87 miles.

I have of course had to assume a path for the northern station, but as the radiant point was indicated, and one point of the meteor's course, I had not much choice in the matter.

Birmingham, Aug. 24

THOS. H. WALLER

ANOTHER NEW COMET

THE following communication, dated Mr. Bishop's Observatory, Twickenham, Aug. 20, has been sent to the *Times* by Mr. J. R. Hind, F.R.S.:

"We have received to-day from M. Stephan, director of the Observatory at Marseilles, telegraphic notice of the discovery of a comet this morning by M. Coggia, in the constellation Taurus, the position of which is thus given:—

"August 19, at 14h. 33min. mean time at Marseilles.—Right ascension, 59° 29'; Polar distance, 62° 55'. Motion towards the south-east. The comet is faint.

"The comet discovered at the same observatory by M. Borrelly, on the 25th of July, I observed here last night as follows:—

"August 19, at 9h. 27min. 38sec. mean time at Twickenham.—Right ascension, 13h. 33min. 7.58sec.; Polar distance, 17° 21' 42.3".

"It does not appear, as yet, to have materially decreased in brightness."

* "Origin of Species," p. 421, 1874.

THE BRITISH ASSOCIATION AT BELFAST

BELFAST, Tuesday Night.

BELFAST is quite the centre of Irish industry, and one of the most progressive towns in the kingdom. People are living who remember it with less than 20,000 inhabitants; now it has near 200,000. As a proof of industry and thrift, it offers a good example to the rest of Ireland. The Association has not met under very favourable circumstances, for unfortunately at this moment no less than 20,000 men in the town are on strike, and somewhat less than 15,000*l.* a week is withdrawn from circulation. A smaller town with a less elastic population would be paralysed, and the influence of the strike is sufficiently felt as it is. The population of the town is very mixed; it is not true Irish. Belfast is less Irish either than Dublin, Cork, Galway, Derry, or Limerick. There is a large leaven of Scotch and Scoto-Irish, who have indeed the merit of a thrifty nature, but who lack many of the good qualities of the Irish; among others, their hospitality. The thrift of these people has caused the hotel and lodging arrangements to be carried out in an abominable manner. We have been shamefully fleeced. One hotel charges a sovereign a night for a bedroom, others half as much; in any case, members of the Association are charged at least double the ordinary prices. In final despair we were driven to inquire at a small coffee-shop whether they had a room; the people replied that they had; but that if we were a member of the Association we must pay ten shillings a night, the ordinary price in that house being about two shillings. When people travel from a distance, and sacrifice time, money, and rest, to do the work of the Association, and not as pleasure seekers, it is rather hard to be swindled because you happen to be a member of the Association.

The Sections have been well filled, and have had plenty of pabulum in the form of papers and verbal communications. Section A has been divided into two Departments, and it is probable that one or two of the Sections will have to sit on Wednesday. The addresses were quite up to the average. Among the more interesting papers were those of Mr. Huggins, On the Spectrum of Coggia's Comet; Prof. Wiedemann, On the Magnetisation of Chemical Compounds; Dr. Carpenter, On the *Challenger* Deep-sea Dredgings; and Mr. E. J. Harland, On a Screw-lowering Apparatus for Ships. The expected fight about the *Eozoön Canadense* did not come off. The specimen and apparatus room is well filled. Among the more interesting objects we observe Prof. Barrett's apparatus for showing the elongation of iron, cobalt, and nickel by magnetisation, Mr. Braham's heliostat and ruled glass used in experiments on light, and Mr. Roberts' illustrations of columnar structure, artificially produced. The Thursday *soirée*, on the other hand, was singularly devoid of exhibitions of any kind, and the Ulster Hall was extremely crowded, both causes tending to make the evening drag rather heavily. There were several excursions on Saturday, and there are many prepared for Thursday, the principal being to the Giants' Causeway. The Mayor, who has throughout been very active in forwarding the interests of the Association, has issued invitations for a trip round the coast on Thursday, for which purpose he has engaged one of the fine Fleetwood mail steamers.

The Association meets next year at Bristol, Sir John Hawkshaw, C.E., F.R.S., being President-elect; Glasgow is to be the place of meeting in 1876, an influential deputation having attended the Association to urge upon it the claims of that city to the honour of its presence. Plymouth will probably be the rendezvous for 1877.

The following is the financial statement of the Association for the past year:—